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STAFF STUDY

January

SUBJECT: Multi-Sensor Reconnaissance Survey of East Rift Zone of
Volcano Kilanea, Hawaii

1. PROBLEM:

As stated in Reference (a) Kilanea on the big island of Hawaii is acting up again and the U.S. Geological Survey desires to perform reconnaissance over the area but does not have the administrative capability to react rapidly enough to mount a reconnaissance effort nor do they have sufficient funds to pay for the effort. Time is of the essence since the scientists now expect further activity very soon. The reconnaissance should start on or about 21 January 1963.

2. ASSUMPTIONS:

An assumption was made by the U.S. Geological Survey that the National Photographic Interpretation Center might aid them in performing the collection of sufficient correlative data which could serve as training material in training multi-sensor photo interpreters.

3. FACTS:

(a) Within the next two years reconnaissance vehicles will be collecting multi-sensor data and to date no one within the National Center has experience in the science of reading out such data.

4. DISCUSSION:

Four Operations Plans have been drawn together using accurate costing data and they are presented in order of their decreasing cost. In comparing them it should be remembered that the U.S. Geological Survey will fund \$5,000 of the cost and will furnish three scientists on the collection team from the Continental Limits; a photo geologist, a geologist, and a camera-man, and will bear the cost of their transportation and per diem which totals to \$3,040.

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GROUP 1
Excluded from automatic
downgrading and
declassification

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5. CONCLUSIONS:

At first glance one might choose any of the three cheaper Ops Plans 2, 3, or 4. However, only number 3 would offer the correlated data that is so necessary for use by NPIC. It is considered absolutely essential that visual imagery be obtained simultaneously with that of other sensors and the commercial twin Beechcraft does not offer this capability.

Ops Plan #3 with a borrowed Naval Aircraft would be the best choice of the lesser expensive routes to follow and is a logical choice.

However, Ops Plan #1 gives the best sweep across the spectrum and as well gives one hidden feature. [REDACTED]

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The first multi-sensor collection effort after this opportunity that NPIC may participate in is the effort which Dr. Scovill and [REDACTED] are attempting to mount. The very first date that this effort can conceivably start is 1 July 1963 with take coming to us about August or September 1963. On the above postulation it can be recognized that the collection from the USGS project could very well provide the information necessary for NPIC to start its first prototype multi-sensor viewing effort by July 1963.

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6. RECOMMENDATIONS:

It is therefore recommended that NPIC join and aid USGS in their collection effort on the Kilanea project. It is further recommended that either Ops Plan #3 or #1 be adopted and further that Ops Plan #1 is preferable since it is the plan that will give the desirable variable take with none of the attendant, time consuming difficulties, of making the equipment fit in the vehicle. Furthermore, such a choice gives widest freedom of action without being forced into the position of asking other activities for favors.

It is further recommended that a priority be placed on this project which would allow the immediate collection of the discussed equipment and personnel at General Lyman Field, Hilo, Hawaii by 21 January 1963. Since all equipments are in readiness this task can be accomplished by the date of 21 January 1963.

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[REDACTED]
Development Branch, P&DS

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OPERATIONS PLAN #1

(Based on a 30 day project with 20 days of full scale operation)

Personnel	3 - U.S. Geological Survey	
	2 - NPIC	
Transportation & Per	1 - Navy or A/F photo	
Diem charges included	3 - Crew of A/C	
in equipment costs.	+2 - Crew of Equipment	
6 Per Diem and Travel		\$ 6,480
(Crew of 3) A/C Rental, 1 month, B-17		20,000
Rolling Stock: 1 pickup, 1 station wagon, 2 sedans (To be rented from GSA on site)		1,400
Film		3,600
25X1D [REDACTED] equipment rental & 1 man		6,000
[REDACTED] Equipment rental & 1 man		6,000
GFE A/C fuel cost		<u>16,000</u>
	TOTAL	\$ 59,480
	Outside figure should not exceed	65,000
	USGS	<u>8,240</u>
	Cost to NPIC -- TOTAL	\$ 57,760

Three two-hour flights per day would be flown for twenty operating days at varying altitudes above the terrain from 1,000' to 25,000'. All cost of transportation of men and equipment to and from is included. NPIC would furnish in addition two portable processing units, processing chemicals, and one light table. A flight track over the earth's surface would be developed and repeated at random intervals.

The data collected on each flight would include:

- One black and white 9 x 9 6" focal length framing camera.
- One infrogon 9 x 9 3 $\frac{1}{2}$ " focal length framing camera.

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OPERATIONS PLAN #1 CONTINUED

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- c.
- d.
- e.
- f.
- g.



- h. One hand held color camera.
- i. One 16mm Motion Picture camera color.

(h) and (i) would be carried and used to collect visible surface phenomena for documentary purposes.


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OPERATIONS PLAN #2

A/C Twin Beechcraft (Commercial) - Based on a 30 day project with 20 days of full scale operation.

Personnel 3 - USGS
 2 - NPIC

5 Per Diem and Travel	\$ 5,400
A/C Rental	12,000
Auto Rolling Stock (2); 1 pickup, 1 station wagon	700
Film	2,700
 & 1 man	<u>6,000</u>


25X1D

TOTAL	\$ 26,800
Outside Cost	30,000
USGS	<u>8,240</u>
NPIC	\$ 21,760

The data collected on each flight would include:

Three two-hour flights per day would be flown for twenty operating days at varying altitudes above the terrain from 1,000' to 10,000'. All costs of transportation of men and equipment to and from is included. NPIC would furnish in addition two portable processing units, chemicals and one light table. A flight track over the earth's surface would be developed and repeated at random intervals.

The data collected on each flight would include:

- (a)  25X1D
- (b) One hand held color framing camera.
- (c) One 16mm Motion Picture Camera

(b) and (c) would be carried and used to collect visible surface phenomena for documentary purposes.

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OPERATIONS PLAN #3

A/C SNB5P - Furnished by the Naval Utility Squadron based on Oahu.

Arrangements could be made as has been done in the past to borrow a Naval Twin-Beechcraft configured for photography. This A/C has two camera bays plus a balometer bay, plus the rear door hatch for obliques.

(Based on a 30 day project with 20 days of full scale operation).

Personnel
3 - USGS
2 - NPIC
2 - Equipment Crew (Transportation & Per Diem charges
Included in equipment costs).

5 Per Diem and Travel \$ 5,400

Auto Rolling Stock (2): 1 pickup, 1 station wagon 700

Film 3,600

Equipment rental & 1 man 6,000

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Equipment rental & 1 man 6,000

A/C Fuel Cost (an offer could be made to the Navy to
pay fuel cost.) 900

TOTAL \$ 22,600

Outside Cost 25,000

USGS 8,240

Cost to NPIC TOTAL \$ 16,760

Three two-hour flights per day would be flown for twenty operating days at varying altitudes above the terrain from 1,000' to 10,000'. All cost of men and equipment to and from is included. NPIC would furnish two portable processing units, chemicals and one light table. A flight track over the earth's surface would be developed and repeated at random intervals.

The data collected on each flight would include:

(a) One black and white 9 x 9 6" focal length framing camera.

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(b)

(c)

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OPERATIONS PLAN #3 CONTINUED

(d)

(e)

(f) One hand held color camera.

(g) One 16mm motion picture camera

(f) and (g) would be carried and used to collect visible surface phenomena for documentary purposes.

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OPERATIONS PLAN #4

A/C Twin Beechcraft (Commercial) Based on a two week with 7 days of full scale operation.

Personnel 3 - USGS
1 - NPIC

4 Per Diem and Travel		\$ 3,136
A/C Rental		4,200
Film		945
Auto Rolling Stock (2); 1 pickup, 1 station wagon		440
 and 1 man		<u>3,000</u>
	TOTAL	\$ 11,721
25X1D	Outside Cost	15,000
	USGS	<u>7,352</u>
	Cost to NPIC	\$ 7,648

Three two-hour flights would be flown for seven operating days at varying altitudes above the terrain from 1,000' to 10,000'. All costs of transportation of men and equipment to and from is included. NPIC would furnish 2 processors and chemicals plus a light table.

In the case of any of the above, it has been discussed that ground data would be collected by the Forest Service and USGS personnel already on site. Operations would be conducted from Lyman Field, Hilo, Hawaii, which is a distance of twenty-five miles from Kilauea Crater. This means that during any two-hour flight a series of 5 collection passes over each rift zone could be performed. The timing of the three daily flights would vary from early morning - noon - late evening on around the clock, dependent upon results desired and the desires of the scientists. Processing of all sensors except the color photography would be performed at Lyman Field, Hilo, Hawaii. The color film would be shipped to Oahu for processing.

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